Force and Pressure

- A push or pull on an object is called a **force**.
- **Push –** When an object is moving away from the applier of force
- **Pull –** When an object is moving towards the applier of force
- Force is a push or a pull which changes or tends to change the state of rest or of uniform motion, or direction of motion or the shape or size of a body.
- Force is any action that has the tendency to change the position, shape, or size of an object.
- Interection of one object with another object results in a force between the two objects.
- The effect of force depends on the magnitude and direction of the force.
- Force applied in the same direction added to one another.
- Force applied in the opposite direction, the net force is given by the difference of two forces.
- Force is a push or pull upon an object resulting from the object's interaction with another object. The various effects of force are:
- Force can move a body initially at rest.
- Force can bring a moving body to rest.
- Force can change the direction of a moving body.
- Force can change the speed of a moving body.
- Force can change the shape of a body.
- Force can change the size of a body.
- **Muscular force –** It involves the action of muscles.
  - Animals make use of muscular force to carry out their physical activities and other tasks.
- **Friction –** It is an opposing force that acts between surfaces in contact moving with respect to each other.
  - Frictional force always acts between two moving objects, which are in contact with one another.

- Frictional force always acts opposite to the direction of motion.
- Frictional force depends on the nature of the surface in contact.

- **Tension Force -** This force appears in a string, attached to a rigid support, when an object is suspended by it.
- **Mechanical Force** - It involves the force generated by machines.
- **Force exerted during collision -**Two objects push each other with an equal but opposite forces if collision occurs between them. These forces are known as the force of action and force of reaction.
- **Combined Forces** - When two or more forces are acting on the same object.
- Non-contact force come into play even when the bodies are not in contact.
- **Magnetic force –** Force acting between two magnets or a magnet and a magnetic material (eg. iron, steel, nickel, cobalt etc.). It can be attractive and repulsive.
- **Electrostatic force –** Force due to electric charges. It can be attractive and repulsive.
- **Gravitational force –** It is a kind of attractive force that comes into play because of the mass of a body. (eg. earth's gravitational attraction).
- The force acting per unit area of surface is called pressure.
- Pressure = $\frac{\text{Force}}{\text{Area on which it acts}}$
- The unit of pressure is Newton per square meter (N/m^2), which is also known as Pascal.
- Smaller the area larger the pressure for the same force.
- Liquids exerts pressure on the walls of the container.
- Pressure exerted by liquids increases with depth.
- Liquids exert equal pressure at the same depth.
- The pressure at which water comes out of the holes is directly proportional to its depth.
- Fluid— Substance which can flow and has no fixed shape
- Pressure due to a liquid column of height *h*:

  $p = h\rho g$

  Where, *h* = Height of column

□□□□ = Density of fluid
g = Acceleration due to gravity

- Pressure inside a fluid increases with increase in depth and density of the fluid.

- Water and gas exert pressure on the walls of their container.
- Atmosphere exerts pressure on the surface of the Earth.

- **Atmospheric pressure** = Weight of the atmosphere per unit area.

- Pressure inside our body is equal to the atmospheric pressure and cancels the pressure from out side.

- Air surrounding the Earth – atmosphere

- Air exerts pressure on its surroundings – thrust on unit area is called atmospheric pressure